

# 承 認 書

## SPECIFICATION FOR APPROVAL

<p><b>CUSTOMER'S APPROVAL CHOP</b> 客 戶 確 認 蓋 章</p>
<p>條件附確認: Approval's condition:</p> <p>確認日期 _____ Approved date: _____</p>

確認這制品, 請簽回一套給我司并蓋上貴司的正式印章  
KINDLY RETURN A SET WITH YOUR COMPANY'S OFFICIAL  
STAMP ON APPROVAL OF THIS ITEM

客 戶 名 稱 :  
**CUSTOMER'S NAME :** \_\_\_\_\_

客 戶 機 型 :  
**CUSTOMER'S MODEL NO. :** \_\_\_\_\_

客 戶 型 號 :  
**CUSTOMER'S PART NO. :** \_\_\_\_\_

類 別 :  
**DESCRIPTION :** \_\_\_\_\_

晶 訊 編 號 :  
**SEMITELE'S MODEL NO. :** \_\_\_\_\_ **SESLC0524P** \_\_\_\_\_

版 本 :  
**VERSION :** \_\_\_\_\_ **A** \_\_\_\_\_

日 期 :  
**DATE :** \_\_\_\_\_ **2016-8-16** \_\_\_\_\_

- 承認書附件:**  
**Attachments:**
- 制品規格書  
Product specification
  - 樣品/Sample Qty.:
  - 測試參數  
Test data

Prepared By	Checked By	Approved By
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# 变更记录

## Revision Record

版本 Version	变更日期 Revision date	变更项目/Revision for items	变更原因/Reason For Revision
A	2016-8-19	新版本/New Revision	-

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## 製品規格書

### Product Specification

#### 1. Features 特性

ESD Protect for Transition Minimized Differential Signaling (TMDS) channels

Protects four I/O lines

Provide ESD protection for each line to

IEC 61000-4-2 (ESD)  $\pm 15\text{kV}$  (air),  $\pm 10\text{kV}$  (contact) IEC 61000-4-5 (Lightning) 5A (8/20 $\mu\text{s}$ )

IEC 61000-4-2 Level 4, 15KV (air), 8KV (contact )

For operating voltage of 5V and below Ultra low capacitance : 0.4pF I/O to I/O

Fast turn-on and Low clamping voltage Array of ESD rated diodes with internal equivalent TVS (Transient Voltage Suppression) diode

Simplified layout for HDMI connectors

Solid-state silicon-avalanche and active circuit triggering technology

Green part

#### 2. Applications 應用

- High Definition Multi-Media Interface (HDMI) 1.3 & 1.4 version DisplayPort interface
- SATA and eSATA interface
- USB3.0
- Digital Visual Interface (DVI)
- USB2.0 up to 480Mb/s
- IEEE 1394 up to 3.2 Gb/s
- Ethernet port: 10/100/1000 Mb/s
- Desktop and Notebooks PCs
- Consumer Electronics
- Set Top Box
- DVDRW Players
- Graphics Cards

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晶訊國際有限公司

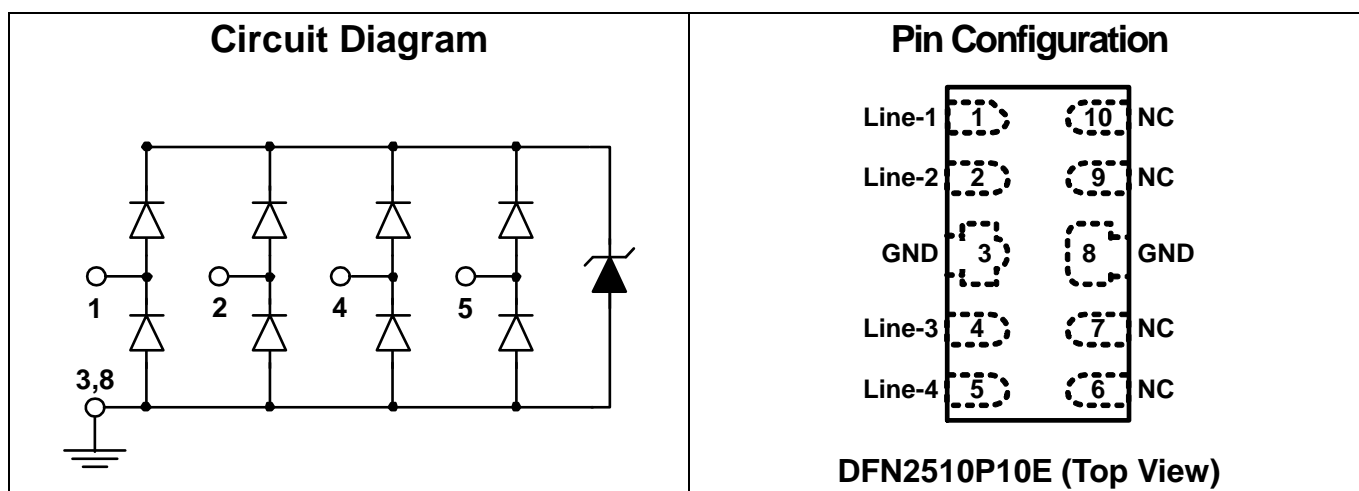


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3.Description 描述

**SESLC0524P** is a design which includes ESD rated diode arrays to protect high speed data interfaces. The **SESLC0524P** has been specifically designed to protect sensitive components which are connected to data and transmission lines from over-voltage caused by Electrostatic Discharging (ESD). **SESLC0524P** is a unique design which includes ESD rated, ultra low capacitance steering diodes and a unique design of clamping cell which is an equivalent TVS diode in a single package. During transient conditions, the steering diodes direct the transient to either the internal ESD line or to ground line. The internal unique design of clamping cell prevents over-voltage on the internal ESD line and on the I/O line, which is protecting any downstream components. **SESLC0524P** may be used to meet the ESD immunity requirements of IEC 61000-4-2, Level 4 ( $\pm 15\text{kV}$  air,  $\pm 8\text{kV}$  contact discharge).



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4.SPECIFICATIONS 規格

Absolute Maximum Rating			
Rating	Symbol	Value	Units
Peak Pulse Power (tp = 8/20μs)	P <sub>pk</sub>	150	Watts
Peak Pulse Current (tp = 8/20μs)	I <sub>pp</sub>	5	A
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	V <sub>ESD</sub>	+/- 17 +/- 12	kV
Operating Temperature	T <sub>J</sub>	-55 to +125	°C
Storage Temperature	T <sub>STG</sub>	-55 to +150	°C

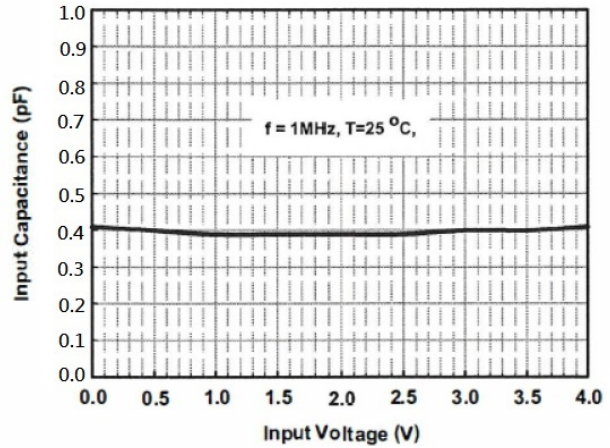
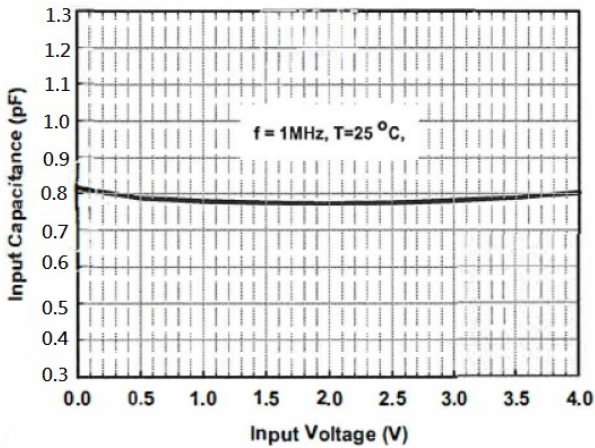
Electrical Characteristics						
Characteristic	Symbol	Conditions	Min	Typical	Max	Unit
Reverse Stand-Off Voltage	V <sub>RWM</sub>	Any I/O pin to Gnd			5	V
Reverse Breakdown Voltage	V <sub>BR</sub>	I <sub>t</sub> =1mA Any I/O pin to Gnd	6			V
Reverse Leakage Current	I <sub>R</sub>	V <sub>RWM</sub> =5V, T=25°C Any I/O pin to Gnd			1	μA
Clamping Voltage	V <sub>C</sub>	I <sub>pp</sub> =5A, tp=8/20us Any I/O pin to Ground		15		V
Junction Capaci	C <sub>j</sub>	V <sub>R</sub> =0V, f=1MHz Any I/O pin to Ground		0.8		PF
		V <sub>R</sub> =0V, f=1MHZ Between I/O pin		0.4		PF

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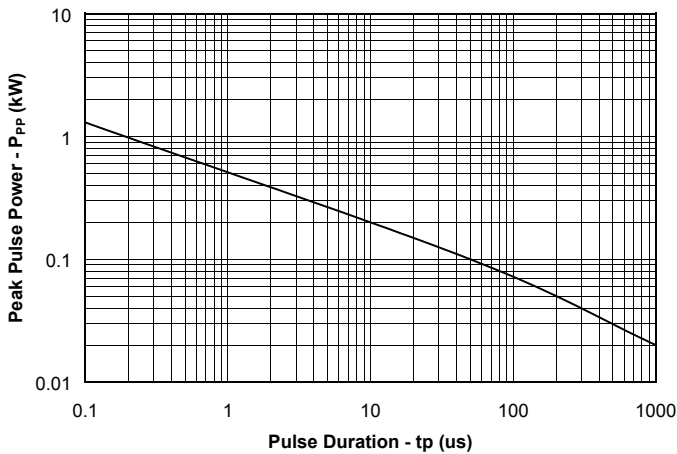
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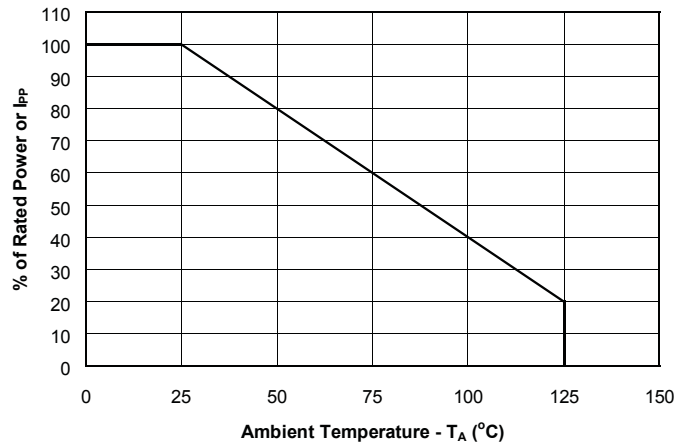
5. Typical Characteristics 典型特徵



Non-Repetitive Peak Pulse Power vs. Pulse Time

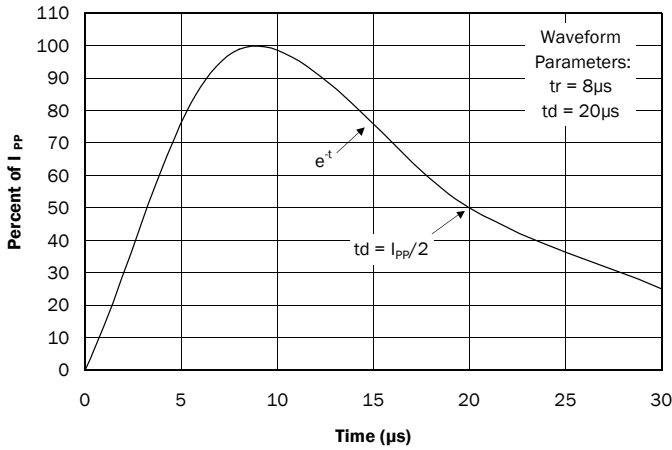


Power Derating Curve

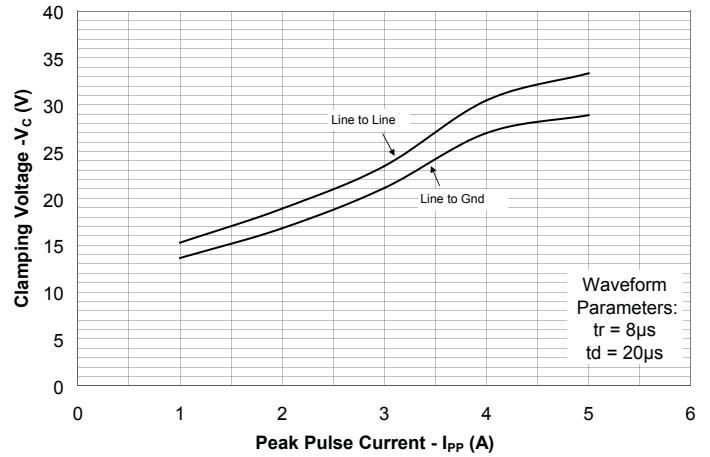


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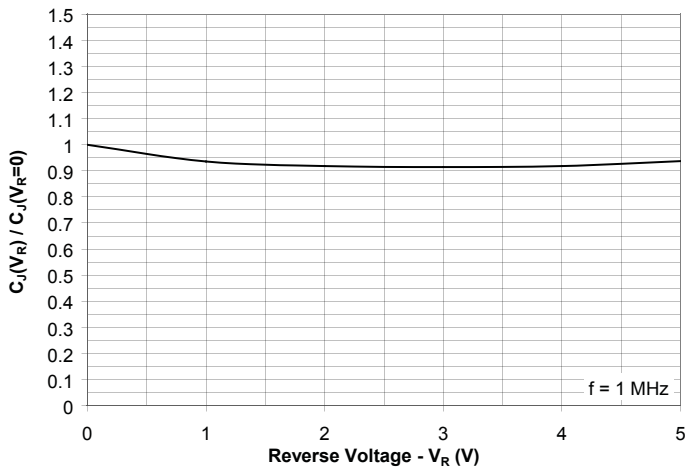
**Pulse Waveform**



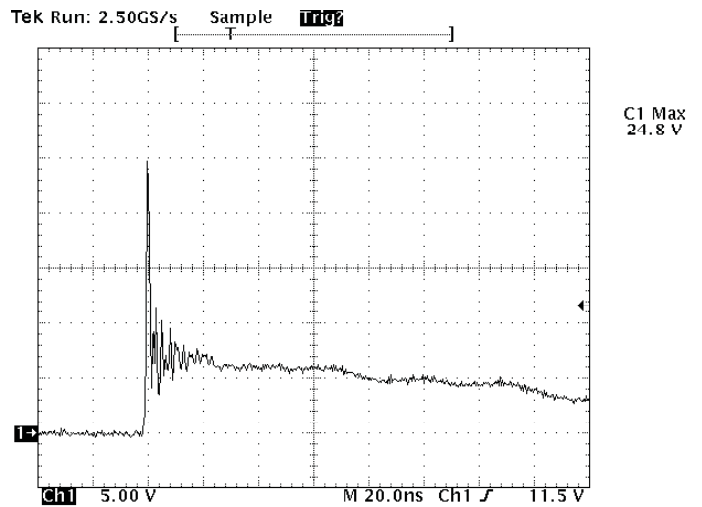
**Clamping Voltage vs. Peak Pulse Current**



**Normalized Capacitance vs. Reverse Voltage**



**ESD Clamping for +8kV pulse per IEC 61000-4-2**



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6.Applications Information 應用資訊

A.Device connection

The **SESLC0524P** is designed to protect four data lines from transient over-voltage (such as ESD stress pulse). The device connection of **SESLC0524P** is shown in the Fig. 1. In Fig. 1, the four protected data lines are connected to the ESD protection pins(pin1, pin2, pin4, and pin5) of **SESLC0524P**. The ground pins (pin3 and pin8) of **SESLC0524P** are the negative reference pins. These pins should be directly connected to the GND rail of PCB (Printed Circuit Board). To get minimum parasitic inductance, the path length should keep as short as possible.

**SESLC0524P** can provide ESD protection for 4 I/O signal lines simultaneously. If the number of I/O signal lines is less than 4, the unused I/O pins can be simply left as NC pins.

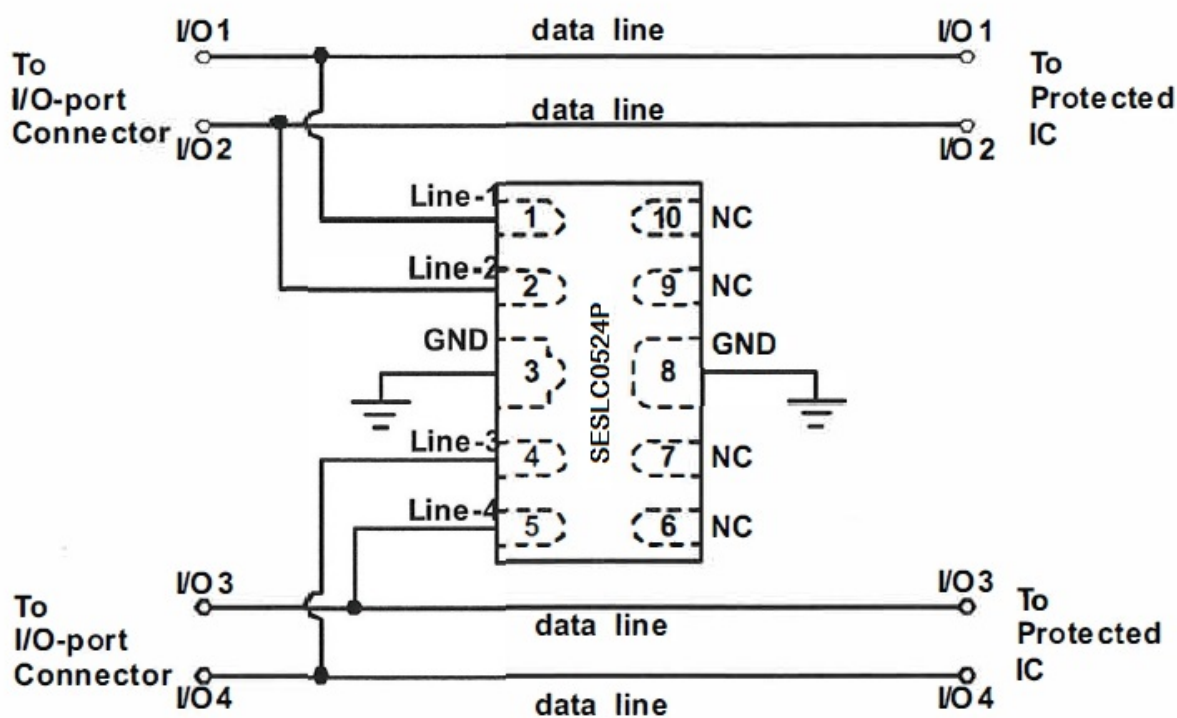


Fig. 1 Data lines connection of SESLC0524P.

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B.Application

SESLC0524P is designed for protecting high speed I/O ports from over-voltage caused by Electrostatic Discharging (ESD). Thus, a lot of kinds of high speed I/O ports can be the applications of SESLC0524P, especially, the HDMI port.

HDMI Protection for High and Low speed signals  
The HDMI Compliance Test Specification (CTS) requires sink (receiver) ports maintain a differential impedance of 100 Ohms +/- 15%.

ESD protection devices have an inherent junction capacitance. Even a small amount of added capacitance on a HDMI port will cause the impedance of the differential pair to drop. Thus, some form of compensation to the layout will be required to bring the differential pairs back within the required 100 Ohm +/- 15% range. The higher the added capacitance, the more extreme the modifications will need to be. If the added capacitance is too high, compensation may not even be possible. The SESLC0524P presents 0.5pF capacitance to each differential signal while being rated to handle >8kV ESD contact discharges (>15kV air discharge) as outlined in IEC 61000-4-2. Therefore, it is possible to make none adjustment to the board layout parameters to compensate for the added capacitance of the SESLC0524P. Figure 2 shows how to implement the SESLC0524P in a HDMI application.

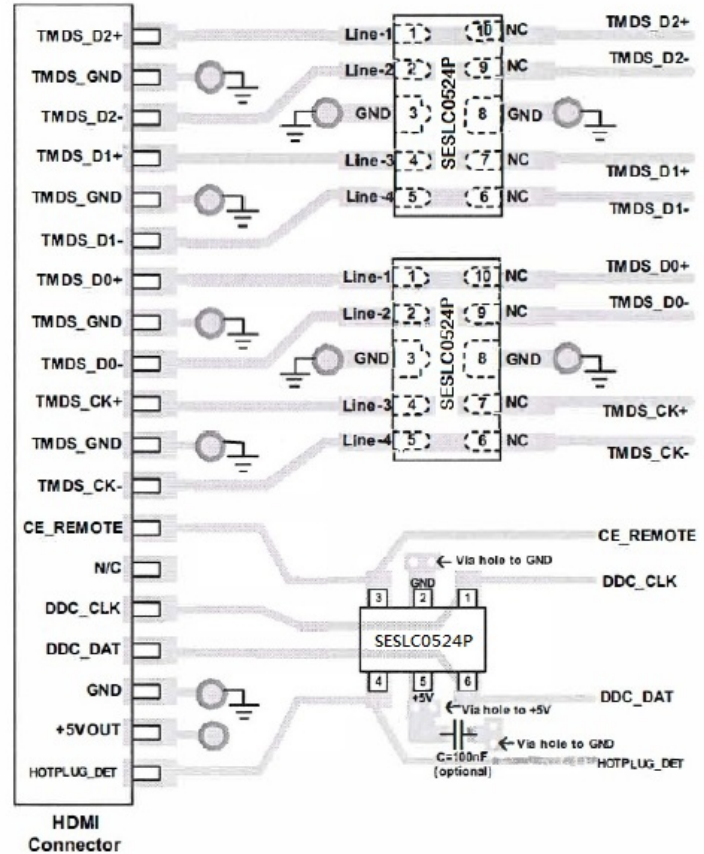


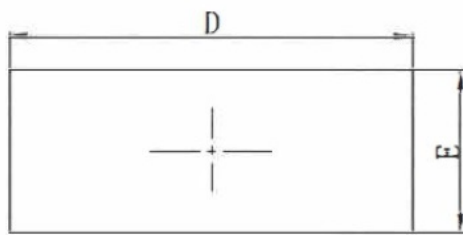
Fig. 2 HDMI Protection for High and Low speed signals.

The SESLC0524P is designed for allowing the traces to run straight through the device to simplify the PCB layout. As shown in Figure 2, the best way to design the PCB trace is using the flow through layout. The solid line represents the PCB trace. Note that the PCB traces are used to connect the pin pairs for each line (pin 1 to pin 10, pin 2 to pin 9, pin 4 to pin 7, pin 5 to pin 6). For example, line 1 enters at pin 1 and exits at Pin 10 and the PCB trace connects pin 1 and 10 together. Lines 2, 3, and 4 have the same way of connection. The ground pins (pin3 and pin8) of SESLC0524P are the negative reference pins. These pins should be directly connected to the GND plane of PCB. To get minimum parasitic inductance, the path length should keep as short as possible. In Figure 2, the none-TMDS signals, DDC\_CLK, DDC\_DAT, CE\_REMOTE, and HOTPLUG\_DET, can be protected with another low cost part, e.g., SESLC0524P.

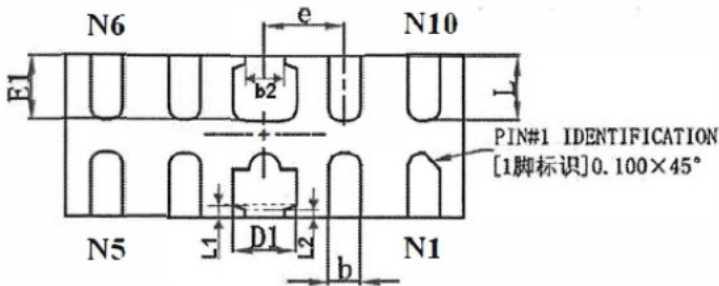
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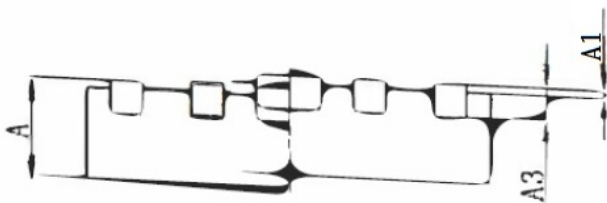
7.PACKAGE OUTLINE 包裝外型  
(DFN251 OP10E)



TOP VIEW (unit in mm)



BOTTOM VIEW (unit in mm)



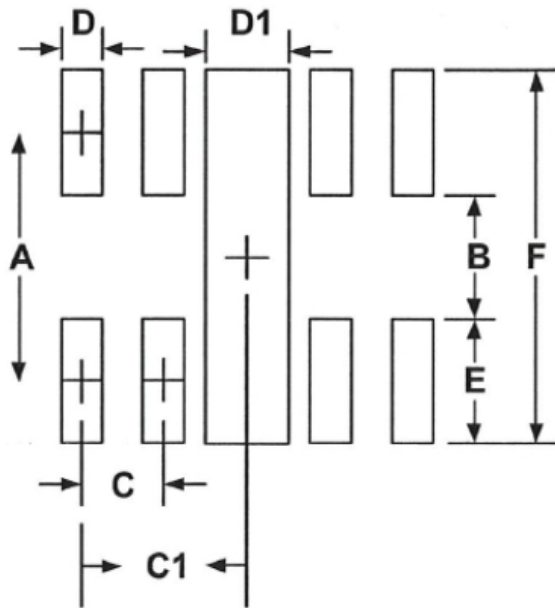
SIDE VIEW (unit in mm)

Symbol	Millimeters		Inches	
	min	max	min	max
A	0.40	0.55	0.016	0.022
A1	0.00	0.05	0.000	0.002
A3	0.152 REF.		0.006 BSC	
D	2.45	2.55	0.096	0.100
E	0.95	1.05	0.037	0.041
D1	0.35	0.45	0.014	0.018
E1	0.35	0.45	0.014	0.018
b	0.15	0.25	0.006	0.010
e	0.5 BSC		0.019 BSC	
L1	0.075 REF		0.0029 REF	
L2	0.05 REF		0.0019 REF	
b2	0.20	0.30	0.0079	0.012
L	0.35	0.45	0.014	0.018

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8.LAND LAYOUT 布局



Dimensions		
Index	Millimeter	Inches
A	0.875	0.034
B	0.20	0.008
C	0.50	0.02
C1	1.00	0.039
D	0.25	0.01
D1	0.4	0.016
E	0.675	0.027
F	1.55	0.061

Notes:  
This LAND LAYOUT is for reference purposes only. Please consult your manufacturing partners to ensure your company's PCB design guidelines are met.

9.MARKING CODE 標識代碼



Part Number	Marking Code
SESLC0524P	0524P

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### 10.Packing 包裝數量

Device	Package	Net Weight	Carrier	Quantity	HSF Status
SESLC0524P	DFN2510	0.0039g	Tape & Reel	3,000pcs/reel	RoHS compliant

1 Box = 5 Reel

1 Carton = 8 Box

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